3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the affected environment in the vicinity of the Proposed Action (the project area) as it exists today, where pertinent existing development, impacts, and disturbances are described. This description is organized by resource with descriptive information taken from a wide range of sources including the BLM and various other federal and state agencies.

3.1.1 Environmental Elements Not Present Within the Project Area

For the purposes of this document, the following resources are not present in the project area and, therefore, would not be adversely affected by implementation of the Proposed Action. Consequently, these resources will not be addressed in this chapter or in Chapter 4.0 (Environmental Consequences) to follow.

- **Floodplains, Wetlands and Prime or Unique Farm Lands -**

  Floodplains and/or wetlands as defined in Executive Orders 11988 and 11990 would not be affected by the Proposed Action. Likewise, there are no prime or unique farm lands that would be affected by the Proposed Action.

- **Wilderness Areas, Wilderness Study Areas and Areas of Critical Environmental Concern -**

  The project area is not located in either an existing or proposed wilderness/primitive area, a wilderness study area (WSA), or an area of critical environmental concern (ACEC).

- **Primary or Sole Sources of Drinking Water -**

  The Proposed Action would not affect any primary or sole sources of drinking water.

- **Wild and Scenic Rivers -**

  There are no designated or candidate wild and scenic rivers that would be affected by the Proposed Action.

3.1.2 Environmental Elements Considered With Minor Effects

The following resources would not be adversely affected by implementation of the Proposed Action. Consequently, these resources will also not be addressed in this chapter or in Chapter 4.0 *(Environmental Consequences)* to follow.

- Fisheries - there are no perennial streams in or adjacent to the CRNGDPA; consequently, there are no fisheries that could be affected by the Proposed Action.

- Paleontology - while the Eocene Wind River Formation is known contain scientifically significant fossils throughout the Wind River Basin, bedrock outcrops which could contain significant fossils are noticeably absent throughout the majority of the project area. Moreover, past construction activity within the CRU has failed to encounter bedrock deposits or paleontological remains. Mitigation recommended in Section 4.3.4 should prove adequate to protect any isolated paleontologic resources which might be encountered as a result of additional oil/gas exploration and development activity in the CRNGDPA.

- Recreation - the project area consists of a mosaic of fee (42.1%), state (15.9%), and federal (42.0%) lands (see Table 1.1 and Figure 1.4), with those isolated tracts of federal land in the northern portion of the CRNGDPA being effectively "landlocked" due to the general lack of a public easement thereto. Access to a large block of federal lands in the south/southwest portion of the CRNGDPA is provided by Natrona County Road #212. However, considering that there are no special recreation management areas or developed recreational sites within the project area and the ownership patterns, recreational opportunities within the CRNGDPA are somewhat limited and would not be adversely affected by the Proposed Action.

- Socioeconomics - neither the economy of Natrona County nor the quality of life for the residents thereof will be adversely affected by the Proposed Action. As described in Chapter 2.0, additional oil/gas exploration and development activity in the CRNGDPA would not result in an increase in the local workforce, with a concomitant burden on the resources of Natrona County and the infrastructure thereof. In point of fact, implementation of the Proposed Action would actually have a positive impact on the economy of Natrona County through increased revenues generated by additional hydrocarbon production from leases within the project area.

- Vegetation - considering that there are no T/E or candidate plant species known to occur within the CRNGDPA, the long-term disturbance of 287.25 acres (4.57% of the total surface acreage) over the LOP does not represent a significant impact to plant communities within the CRNGDPA.

3.2 GENERAL SETTING

The project area is generally situated on the extreme eastern periphery of the Wind River Basin, an intermontane basin which is located within both the Middle Rocky Mountain Division of the Northern

Rocky Mountain Physiographic Province and the Great Plains Division of the Great Plains Physiographic Province (Peterson *et al* 1987). More specifically, the CRNGDPA is situated on the eastern flank of the Wind River Basin, an area which is generally characterized by rolling to sometimes steep semi-mountainous terrain dissected by numerous ephemeral tributary drainages of the South Fork of the Powder River. Elevations in the project area generally range from a low of 5,980 feet along the South Fork of the Powder River at a point located in the SE¼NE¼SW¼ of Section 11, Township 35 North, Range 87 West to a high of 6,409 feet at the southeast corner of Section 32, Township 36 North, Range 87 West.

3.3 AIR QUALITY

3.3.1 Climate, Precipitation, and Winds

The project area is located in a continental semi-arid, cold-temperate-boreal climate (Trewartha 1968). This climate is characterized by a lack of moisture (where evaporation exceeds precipitation), which leads to hot summer days and cool summer nights, but bitterly cold winters. On average, fewer than eight months exceed monthly temperatures greater than 50 degrees Fahrenheit (°F).

Air masses enter the region from the Pacific, and mountains to the west act as effective moisture barriers. The majority of the precipitation occurs as a result of late spring and summer thunderstorms, which coincide with the growing season. The remainder of the precipitation comes in the form of snowfalls, primarily from November through April, with heaviest snowfall in the spring. Annual average precipitation ranges between 10 and 14 inches, with a peak average maximum monthly precipitation of 2.1 inches in May (NOAA 1992). Most precipitation occurs as rain due to frontal systems and thunderstorms. The predicted 50-year, 24-hour intense precipitation amount is 2.6 inches, as generated by extreme thunderstorm events. Average annual total snowfall is approximately 40 inches, with the greatest snowfall occurring during March and April. Due to drifting and sublimation, the snow cover is usually discontinuous.

Monthly mean temperatures range from a January low of nearly 23°F to a monthly mean high of about 71°F in July, with average daily low and high temperatures ranging from 8°F to 30°F in January, and 52°F to 86°F in July. However, as is characteristic of dry continental climates, temperature extremes are pronounced: a record low temperature of -41°F in December and a record high temperature of 104°F in July have been measured in Casper (NOAA 1992). The average number of days per year with a minimum temperature at or below 32°F is 200 days and the average number of days per year with a maximum temperature at or above 90°F is 20 days.

Mean annual evaporation ranges from 45 inches (lake) to 70 inches (pan); therefore the potential evaporation is 21 to 23 inches, compared to the mean annual precipitation of 10 to 14 inches (Martner 1986). This gives an annual deficit of nearly 12 inches, creating a predominantly dry climate where evaporation exceeds precipitation.

Average winds are highly directional. As can be seen from the wind rose in Figure 3.1, winds from the southwest and west-southwest account for over 40 per cent of the total hourly wind directions (SCRAM 1994). In fact, all monthly average prevailing wind directions recorded by NOAA (1992) at Casper occur either in the southwest or west-southwest directions, indicating strong direction dependency. Wind speeds are uniformly high in Casper, ranging from a monthly mean low wind speed of nearly 10 miles per hour (mph) in July, to a maximum monthly mean wind speed of over 16 mph in January (NOAA 1992). The uniformly high wind speeds enhance dispersion, prompting lower pollutant concentrations than would occur in the absence of steady, high wind speeds. Strong, sustained winds occur quite often, and observations indicate winds of 70 to 80 mph (with gust to 100 mph) can occur throughout Wyoming.

Potential severe weather conditions and frequency of occurrence may be summarized as follows (Rykaczewski *et al* 1980). From 1916 through 1967, the Wyoming State Climatologist has reported fifteen tornadoes in the Casper District. For the same reporting period, 165 tornadoes occurred Statewide, with 45 per cent occurring in June, 42 percent in May and July, and twelve per cent occurring during the other nine months.

The majority of thunderstorms occur between April and September, with most occurring in June and July. The Casper District averages 40 to 50 days with thunderstorms annually. Large hail, strong winds, and occasional tornadoes are associated with severe thunderstorms. The Casper District averages between two and four days with hail each year. Lightning is commonly associated with summer thunderstorms, although damage and occurrence data are not often reported.

3.3.2 Air Quality

Current and complete monitoring data for ambient air quality are not available for the Cumulative Impact Study Area. However, based on data collected in similar locations and reviewed by the State of Wyoming, Department of Environmental Quality, Air Quality Division (WDEQ/AQD), air quality levels are assumed to be in attainment for all Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS).

Estimation of background air pollutant concentrations (reported in micrograms per cubic meter, or $\mu g/m^3$) is necessary in order to compare potential total air quality impacts from the Proposed Action and Alternatives with applicable air quality standards. Thus, for comparison against an applicable standard, total impacts are the sum of the background concentration plus direct modeled impacts. It is important that individual background concentration values, model predictions, and applicable air quality standards are for the same averaging time period for each pollutant.

Background air pollutant concentration data were provided by WDEQ/AQD (WDEQ 1996). Background concentrations of carbon monoxide (CO) are taken from representative data collected by WDEQ/AQD and commercial operators, and summarized in the Riley Ridge EIS (USDI-BLM 1983). Nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) gaseous air pollutant data were gathered at the Lost Cabin Gas Plant site in Fremont County (1986-87).

Ozone data were collected in Pinedale, Wyoming (1993-1994). Total Suspended Particulate Matter (TSP) and Particulate Matter less than 10 microns in effective diameter (PM_{10}) were collected in an urban area at the Casper City and County Building (1995). Background air pollutant concentrations and applicable air quality standards are summarized in Table 3.1 (WDEQ 1995, WESTAR 1995).

Table 3.1

Background Air Quality Concentrations, Standards and PSD Increments (in µg/m[3])

Airborne Pollutant	Averaging Time [1]	Background Concentration	Air Quality Standards		PSD Increments	
			WAAQS	NAAQS	Class I	Class II
Carbon Monoxide (CO)	1-hour	3,500	40,000	40,000	none	none
	8-hour	1,500	10,000	10,000	none	none
Nitrogen Oxide (NO_2)	Annual	2	100	100	2.5	25
Ozone (O3)	1 -hour	110	160	235	none	none
Sulfur Dioxide (SO_2)	3-hour	93	1,300	1,300	25.0	512
	24-hour	32	260	365	5.0	91
	Annual	4	60	80	2.0	20
Total Suspended Particulates (TSP)	24-hour	70	150	none	none	none
Particulate Matter 10 (PM_{10})	24-hour	42	150	150	8.0	30
	Annual	19	50	50	4.0	17

Sources: WDEQ 1995, WDEQ 1996, and WESTAR 1995.

Short-term concentrations reflect the maximum measured values during the entire period of record (i.e.; NO_2: 1986 through 1987, TSP and PM_{10}: annual 1995, etc.), except for ozone, which reflects the 90*th* percentile of hourly ozone values measured at Pinedale, Wyoming (1993 through 1994). Short-term (1-hour, 3-hour, etc.) standards allow not more than one expected exceedance per year. Long-term (annual) standards are not to be exceeded.

3.4 CULTURAL RESOURCES

Approximately 408.5 acres have been inventoried for cultural resources in conjunction with previous surface disturbing activities within the overall project area. These inventories were conducted in compliance with the *National Historic Preservation Act* (NHPA) and included lands within the CRNGDPA which were potentially affected by construction activities associated with those projects

identified in Table 3.2. As a result of these inventories, 5 individual cultural properties were identified within the inventoried area(s), 2 of which are considered as potentially eligible for listing on the National Register of Historic Places (NRHP). Copies of the cultural resource inventories referenced in Table 3.2 are currently on file with in both the BLM's PRRA office and with the Wyoming State Historic Preservation Office (SHPO) in Laramie, Wyoming.

Table 3.2

Projects Inventoried for Cultural Resources within the CRNGDPA, Acres Inventoried, and Inventory Results

Facility Operator	Facility Name and Number	Acres Surveyed for Cultural Materials				Sites Identified	Eligible Sites
		Location	Access	Pipelines	Other		
BLM/Casper District	Skyline H_2O P/L	-----	-----	2.31	-----	0	0
Integrity Oil & Gas	1-4 DS Federal	40.00	32.20	-----	-----	3	2
Integrity Oil & Gas	1-33 WS Federal	40.00	0.00	-----	-----	0	0
Integrity Oil & Gas	2-33 Federal	40.00	4.00	-----	-----	0	0
Intoil, Inc.	CRU # 6	10.00	5.70	9.40	-----	0	0
Intoil, Inc.	CRU # 7	10.00	2.90	-----	-----	0	0
Intoil, Inc.	CRU #10	20.00	0.20	-----	-----	1	0
Intoil, Inc.	CRU #12	16.20	6.24	-----	-----	0	0
Intoil, Inc.	CRU #13	15.30	0.00	-----	-----	0	0
Intoil, Inc.	CRU #14	10.00	4.30	-----	-----	0	0
Intoil, Inc.	CRU #15	10.00	1.30	-----	-----	0	0
Intoil, Inc.	CRU #16	10.00	3.30	-----	-----	0	0
Intoil, Inc.	CRU #17	10.00	0.00	-----	-----	0	0
Intoil, Inc.	CRU #18	10.00	2.90	-----	-----	0	0
Intoil, Inc.	Compressor Sta.	1.00	0.00	-----	39.70	0	0
Prima Oil & Gas Co.	Federal 11-23	40.00	11.50	-----	-----	1	0
Totals		**282.50**	**74.54**	**11.71**	**39.70**	**5**	**2**

The cultural resource inventories referenced in Table 3.2 involved portions of 14 sections within the CRNGDPA, 8 of which were located in Township 35 North, Range 87 West, with the remaining 6 sections located in Township 36 North, Range 87 West. These inventories identified 3 prehistoric cultural properties recorded by Powers Elevation Company prior to 1980 in conjunction with the Integrity Oil & Gas Company 1-4DS Federal well location. A brief synopsis of these cultural properties is provided below:

- Site 48NA992 is reported as a "hearth, firepit, fire-cracked rock, charcoal" site and is located in Section 4 of T35N, R78W. This site is considered as eligible for inclusion to the NRHP.

- Site 48NA993 is reported as a "bison pound/kill, bone bed, bone scatter" site and is located in Section 34 of T36N, R87W. The site is also considered as eligible for inclusion to the NRHP.

- Site 48NA249 is reported as a "possible camp, work area, lithic scatter, flakes" site and is located in Section 33 of T36N, R87W. The file search states that the site form contains information concerning the eligibility of said site for inclusion to the National Register of Historic Places (NRHP); however, the actual site form contains no mention of site eligibility but recommends that the site be avoided and that subsurface cultural materials may be present therein.

In addition to the prehistoric sites identified above, 3 historic sites have also been recorded within the CRNGDPA and include 2 stock (sheep) herder camps (48NA994 and 48NA2499) and 1 stone cairn (48NA2469).

3.5 GEOLOGY AND MINERALS

Geologic units within the CRNGDPA include the Meeteetse and Lance Formations of Late Cretaceous age, Paleocene Fort Union, and Eocene Wind River Formations. The primary geologic units that are targeted for natural gas exploration and development activity within the area are the Lance and lower Fort Union Formations.

Johnson *et al* (1996) describes the Lance Formation as consisting of interbedded fine to coarse grained, in part conglomeratic sandstone, shale, mudstone, carbonaceous shale, and thin coal beds. Sandstone generally prevails in the lower part of the formation and finer grained strata in the upper part. Very coarse to conglomeratic sandstones occur in the western part of the Wind River Basin, reflecting local uplift and erosion of highlands adjacent to the subsiding Wind River Basin trough (Keefer and Troyer 1964), but no conglomerates have been observed in exposures along the southern and eastern margins of the basin. The Lance ranges in thickness from a wedge-edge where it is truncated beneath younger rocks along the southern margin of the Wind River Basin to a maximum of 6,860 feet in the northeastern part of the basin (Johnson *et al* 1996). The contact between the Lance Formation and the overlying lower member of the Fort Union Formation is difficult to distinguish in the deeper parts of the Wind River Basin as all of these strata were deposited under similar depositional conditions that persisted from late Cretaceous into Paleocene times (Johnson *et al* 1996). The Fort Union Formation was divided into three members in the Wind River Basin by Keefer (1961a, 1961b, 1965, 1969) and include (in ascending order) the lower unnamed member (lower Fort Union), the Waltman Shale, and the Shotgun member. The lower member is mainly of fluvial origin and was described by Keefer (1965) in a surface section near Waltman as consisting predominantly of white fine to very coarse grained sandstone and siltstone. Keefer (1961b) indicated that the contact between the lower Fort Union and the Waltman Shale member is sharp and well defined on geophysical logs (Johnson *et al* 1996).

3.5.1 Geology

During the late Cretaceous period, numerous streams and rivers were meandering over a relatively flat basinal area in what is known today as the Wind River Basin. These rivers and streams generally

flowed to the east/northeast into the Cannonball Sea, located in modern day South Dakota and were largely responsible for the deposition of over 11,000 feet of sediment in the deeper portions of the basin. These sediments were composed primarily of channel sandstones, shales, carbonaceous shales, siltstones, and coals which originated in the emerging Granite and Wind River Mountain ranges (Anderson 1995).

As the Granite and Wind River Mountains continued to be elevated, these streams and rivers formed a fluvial system that deposited sandstone(s) in a sequence that today is identified as the lower unnamed member of the Fort Union (LFU) and Lance Formations. Depending upon the rate of deposition and the ability of the rivers and streams to erode the emerging mountain ranges, differential sandstone deposition occurred which makes it difficult to distinguish between the LFU and Lance Formations in this portion of the Wind River Basin. During this period of deposition, the Wind River Basin was filling from the center outward to the edges of the basin. As the basin filled, subsequent rises in the mountain ranges resulted in an accelerated rate of erosion and concomitant deposition of sediments into the basin, creating wedge-shaped deposits of sediments. These tilted wedges thickened to the north and this depositional sequence in the LFU/Lance was repeated numerous times, resulting in an indistinguishable rock package that is difficult to identify or separate by formation by any means other than palynology. As a result, the Lance Formation can not be accurately separated from the LFU Formation using rock type, seismic data, or well logs in the Wind River Basin. Consequently, all that can be done to differentiate between these two formations is to split the fluvial package which comprises the LFU/Lance (LFU/L) Formations at some point (Anderson 1995).

Based on this information, the LFU/L Formations, undifferentiated within the CRU have been defined as the rocks which occur from the base of the Waltman Shale member of the Fort Union Formation to a depth of 6,000 feet below the base of the Waltman Shale member. All rocks between this depth and the top of the Meeteetse Formation are defined as the Lance Formation.

3.5.2 Minerals

The project area is situated in and adjacent to the Cooper Reservoir Natural Gas Field, discovered by Chevron U.S.A. in June, 1959 when production was established from the LFU Formation at the Cooper Reservoir Unit #1 well location. After the initial discovery, Chevron drilled 4 additional wells between 1959 and 1964 which also tested the productive potential of the LFU in the Cooper Reservoir Unit. These 4 wells were subsequently plugged and abandoned by Chevron (see Figure 1.2 and Table 3.3).

Intoil acquired the CRU from Chevron in 1991 and has since drilled 9 additional wells therein, all of which produce from either the LFU or LFU/L undifferentiated Formation (or both). Since it's initial discovery in 1959, the Cooper Reservoir Field has produced a cumulative total of 4,766 barrels of condensate and 13,497,740 mcf of natural gas. At the end of 1995, there were four (4) producing wells within the Cooper Reservoir Field which produced 558 barrels of condensate and 74,614 mcf of

natural gas during the month of December, with a cumulative total of 3,601 barrels of oil (condensate) and 483,939 mcf of natural gas produced for the entire year (WOGCC 1997).

Table 3.3

Previous Oil/Gas Exploration and Development Activity within the CRNGDPA

Operator of Well	Well Name and Number	Legal Location of Oil/Gas Well				Year Drilled	Current Status
		Quarter	Section	Township	Range		
Chevron, U.S.A.	CRU #1	SE¼SW¼	3	35 North	87 West	1959	INJ [1]
Chevron, U.S.A.		SE¼SW¼	34	36 North	87 West	1959	D/A
Chevron, U.S.A.		SE¼SW¼	4	35 North	87 West	1960	P/A
Chevron, U.S.A.	CRU #4	SE¼SW¼	10	35 North	87 West	1964	P/A
Chevron, U.S.A.	CRU #5	SW¼NE¼	15	35 North	87 West	1964	P/A
Harvey Broyles	Federal #1	NW¼SE¼	9	35 North	87 West	1968	D/A
Integrity Oil & Gas	1-4 DS Federal	NE¼NW¼	4	35 North	87 West	1978	SI [2]
Integrity Oil & Gas		NW¼SE¼	33	36 North	87 West	1978	SI [2]
Integrity Oil & Gas		SW¼NW¼	33	36 North	87 West	1979	P/A
		SE¼NW¼	10	35 North	87 West	1994	PGW
		SW¼SW¼	3	35 North	87 West	1995	PGW
		SE¼NE¼	4	35 North	87 West	1995	PGW
		NW¼NE¼	3	35 North	87 West	1996	SI
		SW¼SE¼	3	35 North	87 West	1996	PGW
		NE¼NE¼	4	35 North	87 West	1996	PGW
		NW¼NE¼	10	35 North	87 West	1997	PGW
		NW¼NW¼	10	35 North	87 West	1997	PGW
		SW¼SE¼	4	35 North	87 West	1997	WOC
Terra Resources, Inc.	6-2 Federal	SE¼NW¼	2	35 North	87 West	1974	D/A

Notes: 1. Well is currently operated by Intoil as an injection well for the disposal of water produced in the CRU.
2. Wells are currently operated by Warren Enterprises, Inc.
3. Locations with "twin" wells.

3.6 HYDROLOGY

3.6.1 Surface Hydrology

The CRNGDPA encompasses portions of 4 separate watersheds (see Figure 3.2). These watersheds are identified below along with the approximate acreages of each watershed within the project area.

Adobe Reservoir, containing approximately 450 acres or 7.16% of CRNGDPA.

2. Poison Creek Tributary, containing approximately 339 acres or 5.40% of CRNGDPA.

3. Sand Draw, containing approximately 3,135 acres or 49.90% of CRNGDPA.

4. South Fork of Powder River, containing approximately 1,951 acres or 31.06% of CRNGDPA.

The bulk of the project area is located within the Sand Draw and South Fork of the Powder River watersheds (see Figure 3.2). As their names imply, these watersheds are drained primarily by ephemeral drainages of both Sand Draw and the South Fork of the Powder River. The northwestern corner of the CRNGDPA is included within the Adobe Reservoir and Poison Creek Tributary watersheds, which are drained by ephemeral drainages of Poison Creek. All of these drainages are intermittent in nature and normally flow only during periods of spring runoff and/or localized periods of heavy rainfall. Runoff generated in the Sand Draw and South Fork of the Powder River watersheds would flow to the east/northeast out of the project area while runoff generated in the Adobe Reservoir and Poison Creek Tributary watersheds would flow to the west out of the project area. All four watersheds drain into the Missouri River system, which ultimately flows into the Gulf of Mexico via the Mississippi River.

Approximately 407.38 acres within the CRNGDPA are located outside of the boundaries of the four designated watersheds depicted in Figure 3.2. Of the 407.38 acres which are outside of these designated watersheds, 337 acres (5.36%) were included in the Upper Sand Draw watershed analyzed in the Cave Gulch-Bullfrog-Waltman Natural Gas Project EIS (USDI-BLM 1997). The remaining 70.38 acres represents 1.12% of the overall acreage within the CRNGDPA; however, this acreage is located in fringe areas adjacent to the exterior boundaries of the CRNGDPA which would probably not be impacted by surface disturbing activities associated with the proposed action.

Topographic maps of the CRNGDPA reveal that 5 separate stock reservoirs (surface impoundments) existed within the project area at the time the area was originally mapped by the U.S. Geological Survey (ca. 1952). A review of aerial photographs taken of the overall project area on June 7, 1996 revealed that only 2 of these 5 stock reservoirs were holding water at the time of the overflight. Both reservoirs were constructed on the same second order ephemeral tributary drainage of Sand Draw and are located as follows:

1) SW¼SW¼NE¼ of Section 34, Township 36 North, Range 87 West; and

2) NE¼SE¼SW¼ of Section 35, Township 36 North, Range 87 West.

Subsequent inventories of these reservoirs (spring 1998) indicated that these impoundments have silted in over the years and were not holding water at the time of the field inspection(s).

On February 24, 1998 the Wyoming State Engineer's Office conducted a computerized search of their database in an attempt to identify valid existing water rights within the CRNGDPA. Four (4) unadjudicated water rights were identified as a result of this search, 2 of which were for stock reservoirs as follows:

- Permit Number P4676S issued to C.A. Fenton on August 29, 1962 for a 1.80 acre-foot surface impoundment on Aspirin Draw for stock watering purposes and located in the NE¼NE¼ of Section 16, Township 35 North, Range 87 West; and

- Permit Number P6003S issued to Rochelle Sheep Company on June 29, 1967 for a 1.66 acre-foot surface impoundment on Muddy Draw for stock watering purposes and located in the SE¼NW¼ of Section 34, Township 36 North, Range 87 West.

3.6.2 Sub-Surface Hydrology

As indicated in Section 3.5, the primary, near-surface, fresh water aquifer within the CRNGDPA is the Eocene Wind River Formation. The lower portion of the Wind River Formation consists principally of poorly bedded siltstone interbedded with lenticular sandstones, while the upper portion of the formation consists of medium to coarse grained arkosic sandstone and conglomerate with minor amounts of lenticular siltstone, claystone, and carbonaceous shales (Crist and Lowry 1972). Within the CRNGDPA, the Wind River Formation extends from the surface to a depth of approximately 2,000 feet. Information compiled by Crist and Lowry (1972) concerning water bearing properties of the Wind River Formation in Natrona County indicate that water wells are typically drilled into the Wind River Formation for stock and/or domestic purposes to depths less than 500 feet, with drilling operations suspended once the required yield has been obtained. Most of these water wells are pumped and yields typically do not exceed 25 gallons per minute (gpm). A review of existing ground water rights within the CRNGDPA by Office of the Wyoming State Engineer on both November 18, 1997 and again on February 24, 1998 indicated that water well permits have been granted within the project area as follows:

- NE¼SW¼ of Section 3, Township 35 North, Range 87 West. Twidale #1, Permit #P91883W issued to Russell Forgey Construction Company and the Wyoming Board of Land Commissioners, Priority Date 06/04/93. Well drilled to a total depth of 380 feet, yield 5 gpm.

- SW¼NE¼ of Section 33, Township 36 North, Range 87 West. Side Hill #1, Permit #P3461W issued to Deer Creek Ranch, Inc. and the Wyoming Game & Fish Commission, Priority Date 11/07/69. Well drilled to a total depth of 150 feet, yield 10 gpm.

- SE¼NW¼ of Section 3, Township 35 North, Range 87 West. Cooper Reservoir Unit #1 Water Supply Well, Permit #UW-107836 issued to Intoil, Inc., Priority Date 10/9/97. Well drilled to a total depth of 550 feet, yield 25 gpm.

3.7 RANGE

The 2,640.28 acres of public land included within the CRNGDPA encompass portions of three separate grazing allotments, each of which are currently subject to a separate grazing lease. Table 3.4

provides general information concerning each grazing allotment within the CRNGDPA including allotment name and number, grazing lessee, lease number, total acres, and total Animal Unit Months (AUM's).

Table 3.4

Grazing Allotments in the CRNGDPA

Allotment Name	Allotment Number	Grazing Lessee(s)	Grazing Lease Number	Total Acres in CRNGDPA	Total AUM's in CRNGDPA
South Hiland	10030	Deer Creek Ranch, Inc.	496071	1,280.28	149.16
Skyline	10145	David Mackenzie	496179	960.00	154.60
Springsteen	20520	George & Penny McKim	496412	400.00	49.52
Total				**2,640.28**	**353.28**

Table 3.5 provides more specific information concerning each of the three grazing leases including the legal description of each lease, the number of acres within each lease parcel, and the acres per AUM.

Table 3.5

Description of Grazing Leases on Public Lands within the CRNGDPA

Grazing Lessee	Lease Number	Legal Location of Grazing Lease				# Acres	Acres/ AUM
		Quarter	Section	Township	Range		
Deer Creek Ranch, Inc.	496071	W½	2	35 North	87 West	320.28	5.50
		N½	9	35 North	87 West	320.00	6.15
		N½	10	35 North	87 West	320.00	6.15
		NW¼	11	35 North	87 West	160.00	8.00
		SE¼	28	36 North	87 West	160.00	8.47
David Mackenzie	496179	SE¼	9	35 North	87 West	160.00	6.27
		S½	10	35 North	87 West	320.00	6.27
		N½, N½S½	15	35 North	87 West	480.00	6.15
George & Penny McKim	496412	SW¼	11	35 North	87 West	160.00	7.06
		NW¼, N½SW¼	14	35 North	87 West	240.00	9.01

On the average, the public rangelands within the project area have a carrying capacity of 7.5 acres per AUM for domestic livestock and are generally utilized as year-round pasture by the permittees. We may assume that similar, state and/or privately-owned, rangelands within the project area would also

have a carrying capacity of approximately 7.5 AUM's and that grazing practices would be similar to those currently being utilized on public lands. Range improvements within the CRNGDPA consist primarily of cross-fencing along property and/or allotment boundaries, as well as the stock reservoirs and water wells identified in Section 3.6.2 (above).

Several species of noxious weeds have become established on disturbed sites throughout Wyoming and the CRNGDPA. Some of the more common weed species include Canada thistle, musk thistle, Russian knapweed, spotted knapweed, and leafy spurge.

3.8 SOILS

The Wind River Basin exhibits a wide range of soils which are directly associated with the topography. Variations in soils are due to the differing origins of parent materials, different climatic conditions, and the effects of different types of vegetation. In this regard, a Third Order Soils Inventory of Natrona County has been conducted by the U.S. Department of Agriculture, Soil Conservation Service. As a result of this inventory, soils within the project area have been mapped and classified (see Figure 3.3). Table 3.6 provides information concerning those soil mapping units within the CRNGDPA, total acres, the percentage of total acres, and sensitivity of these soils. Table 3.7 provides a summary of the physical characteristics of individual soils within each of these soil mapping units.

Table 3.6

Soil Mapping Units within the CRNGDPA

Map Unit	Name of Soil Mapping Unit	# Acres	% of Area	Sensitive Soil
112	Arvada-Absted-Slickspots complex, 0-6% slopes	20	0.32	No
130	Bosler-Alcova complex, 2 to 10% slopes	98	1.56	Yes
132	Bowbac-Hiland fine sandy loams, 3 to 10% slopes	1,364	21.71	No
194	Haverdad-Clarkelen complex, 0 to 3% slopes	60	0.96	No
201	Hiland sandy loam, 0 to 6% slopes	3,267	52.00	No
207	Keeline-Taluce-Rock Outcrop complex, 6 to 20% slopes	401	6.38	No
209	Keyner-Absted-Slickspots complex, 0 to 6% slopes	695	11.06	Yes
227	Orella-Cadoma-Petrie clay loams, 3 to 30% slopes	199	3.17	Yes
236	Petrie-Arvada complex, 0 to 6% slopes	11	0.18	No
282	Terro-Vonalee association, 3 to 15% slopes	3	0.05	Yes
293	Ulm-Absted complex, 0 to 6% slopes	36	0.57	No
301	Vonalee-Hiland complex, 3 to 15% slopes	81	1.29	Yes
310	Zigweid loam, 2 to 9% slopes	47	0.75	No

Table 3.7

Summary of the Physical Characteristics of Individual Soil Mapping Units in the CRNGDPA

Soil Map Unit #	Soil Map Unit Name	Slope Phase	Topography	Soil Series	Parent Material	Soil Depth	Predominant Soil Texture	Drainage	Permeability	Effective Rooting Depth
112	Arvada-Absted-Slickspots complex	0 to 6%	alluvial fans and low terraces	25% Arvada clay loam	sodic alluvium	deep	sandy clay loam	well	slow	> 60 in
				30% Absted clay loam	alluvium from sodic shale	very deep	clay loam	well	slow	> 60 in
				15% Slickspots	sodic shale	shallow	clay	poor	very slow	< 60 in
130	Bosler-Alcova complex	2 to 10%	plateaus	55% Bosler sandy loam	alluvium from various sources	very deep	sandy clay loam	well	moderate	> 60 in
				30% Alcova fine sandy loam	alluvium from various sources	very deep	sandy clay loam	well	moderate	> 60 in
132	Bowbac-Hiland fine sandy loams	3 to 10%	hills	40% Bowbac fine sandy loam	slopewash alluvium/residuum derived from sandstone	mod deep	sandy/clay loams	well	moderate	20 to 40 in
				40% Hiland fine sandy loam		very deep	fine sandy loam	well	moderate	< 60 in
194	Haverdad-Clarkelen complex	0 to 3%	floodplains	55% Haverdad loam	alluvium derived from various sources	very deep	loam, silty/sandy loams	well	moderate	> 60 in
				35% Clarkelen fine sandy loam		very deep	fine sandy loam, loamy sand	excess well drained	mod rapid	> 60 in
101	Hiland sandy loam	0 to 6%	alluvial fans	80% Hiland sandy loam	alluvium derived from sandstone	very deep	sandy/sandy clay loams	well drained	moderate	> 60 in
107	Keeline-Taluce-Rock Outcrop complex	6 to 20%	hills	50% Keeline fine sandy loam	slopewash alluvium/residuum derived from sandstone	very deep	fine sandy loams	excessively well to well drained	moderately rapid	< 60 in
				20% Taluce fine sandy loam	residuum derived from sandstone	shallow, very shallow	fine sandy loam, platy sandstone			6 to 20 in
				15% Rock Outcrop	exposed sandstone	n/a	exposed sandstone	n/a	n/a	n/a
109	Keyner-Absted-Slickspots complex	0 to 6%	alluvial fans and low terraces	50% Keyner sandy loam	sodic alluvium derived from various sources	deep	loamy sand, sandy clay loam	well drained	slow	> 60 in
				20% Absted sandy clay loam	alluvium derived from sodic shale	very deep	sandy clay loam, clay loam, clay	well drained	slow	> 60 in
				15% Slickspots	sodic shale	shallow	clay	poorly drained	very slow	< 60 in
127	Orella-Cadoma-Petrie clay loams	3 to 30%	hills and adjacent alluvial fans	40% Orella clay loam	residuum derived sodic shale	shallow	clay loam, clay	well drained	very slow	10 to 20 in
				20% Cadoma clay loam	residuum, slopewash alluvium derived from sodic shale	mod deep	clay loam, silty clay loam	well drained	slow	20 to 40 in
				20% Petrie clay loam	alluvium derived from sodic shale	very deep	clay loam, silty clay loam	well drained	very slow	> 60 in
136	Petrie-Arvada complex	0 to 6%	alluvial fans and terraces	50% Petrie clay loam	alluvium derived from sodic shale	very deep	clay loam, saline clay	well drained	very slow	> 60 in
				30% Arvada fine sandy loam		very deep	sandy loam, saline clay	well drained	very slow	> 60 in
182	Terro-Vonalee association, rolling	3 to 15%	rolling hills	50% Terro loamy sand	slopewash alluvium derived from sandstone	mod deep	loamy sand, sandy loam	well drained	mod rapid	20 to 40 in
				30% Vonalee fine sandy loam		very deep	sandy loam	well drained	mod rapid	> 60 in
193	Ulm-Absted complex	0 to 6%	alluvial fans	60% Ulm loam	alluvium derived from shale and sandstone	very deep	loam, clay loam	well drained	slow	> 60 in
				30% Absted fine sandy loam	alluvium derived from sodic shale	very deep	fine sandy loam, clay loam	well drained	slow	> 60 in
308	Vonalee-Hiland complex	3 to 15%	stable sand dunes	45% Vonalee loamy sand	eolian deposits derived from sandstone	very deep	sandy loam, loamy sand	well drained	mod rapid	> 60 in
				40% Hiland sandy loam	sandstone alluvium and eolian deposits	very deep	sandy loam, sandy clay loam	well drained	moderate	> 60 in
311	Zigweid Loam	2 to 9%	alluvial terraces and fans	sandstone alluvium	very deep	very deep	fine sandy loam, loam	well drained	moderate	> 60 in

3.9 VISUAL RESOURCES

The northern portion of the CRNGDPA falls within a 3 mile buffer zone established along U.S. Highway 20-26 which was included within Visual Resource Management (VRM) Class III by the Platte River Resource Area (PRRA) Office in their *Oil & Gas Environmental Assessment* dated March, 1982. Under this VRM class, changes in the basic elements (form, line, color, or texture) may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing (land) character. The natural landscape in this 3-mile corridor along either side of U.S. Highway 20-26 has been subjected to some extensive cultural modifications, all of which contribute to the degradation of the scenic values in the area directly north of the CRNGDPA. These cultural modifications include, but are not limited to, the following facilities.

Above-ground power transmission lines traversing the overall project area and extending to the north across U.S. Highway 20-26 directly to the west of the community of Waltman.

2. An existing KN Energy compressor station located in the SE¼NE¼NE¼ of Section 36, T36N, R87W, approximately 1 mile south of the community of Waltman (east side of Natrona County Road 212).

3. An existing rural store and junkyard located in the S½SW¼ of Section 19, T36N, R86W at the community of Waltman (north side of U.S. Highway 20-26).

4. Ranch outbuildings and commercial facilities including an industrial water well and a drilling rig stack yard located approximately 1/2 mile south of the community of Waltman in the NE¼SW¼ of Section 30, T36N, R86W.

5 Ranch outbuildings located approximately 2 miles west of the community of Waltman in the SW¼ of Section 23, T36N, R87W.

6. A State of Wyoming rest stop located approximately 2 miles west of the community of Waltman in the SW¼ of Section 23, T36N, R87W (north side of U.S. Highway 20-26).

7. An industrial water well with associated water storage tanks and a tank truck parking facility located in the NE¼NE¼ of Section 30, T36N, R86W approximately 3/4 mile east of the community of Waltman (north side of U.S. Highway 20-26).

8. Oil/gas well facilities within 1 mile of U.S. Highway 20-26 which are visible to travelers thereon, including 4 producing gas wells and 2 wells which have just recently been drilled as follows:

   a) Waltman Unit #6: SE¼NW¼ of Section 19, T36N, R86W (producing gas well);

   b) Waltman Unit #21-19: SW¼SW¼ of Section 19, T36N, R86W (producing gas well);

   c) Harris #1 SE¼SW¼ of Section 19, T36N, R86W (waiting on completion);

d) Waltman Unit #4: NW¼NE¼ of Section 24, T36N, R87W (producing gas well);

e) Waltman Unit #19: NE¼SE¼ of Section 24, T36N, R87W (producing gas well); and

f) Horstman #14-21 SW¼SW¼ of Section 24, T36N, R87W (drilled and abandoned, but not yet reclaimed).

The remaining portions of the CRNGDPA which are outside of the 3 mile corridor along U.S. Highway 20-26 fall within VRM Class IV. Under this VRM Class, changes may subordinate the original composition and character of the landscape, but must reflect what could be a natural occurrence within the characteristic landscape (USDI-BLM 1982). Cultural modifications to the existing landscape along Natrona County Road 212 include many of the facilities listed above, in conjunction with existing development within the CRU (refer to Table 3.3 and Figure 1.2).

3.10 WILDLIFE

The differing climatic conditions described in Section 3.2 tend to produce differing floral and faunal communities, referred to by Cary (1917) as life zones. Of the life zones he described for Wyoming, all five (5) can be found in the Wind River Basin. The vertical boundaries of these life zones are determined by factors such as latitude, base level, and slope exposure in the northern regions of North America, which have a lower base level due to higher latitude. In situations where altitude changes are gradual (e.g., the open plains) changes from one life zone to another are scarcely noticeable. In localities where plant and animal surveys have been performed, a marked dominance of characteristic species of a particular zone often defines the zonal position while nearby equal representation, or a marked absence, of a species peculiar to two (2) adjoining zones is indicative of an intermediate position, or the approximate boundary thereof (USDA-SCS 1974).

These five (5) life zones range from the Upper Sonoran, at the lowest and warmest elevations, through the Transition, Canadian, and Hudsonian to the Arctic-Alpine zone on the crests of the highest mountain ranges. It should be noted that elevation ranges for these zones are very flexible and the ranges given are general and should not be considered absolute. In this regard, the general project area appears to occupy the boundary between the Upper Sonoran and Transition Life Zones as described by Cary (1917) for Wyoming (USDA-SCS 1974).

3.10.1 Upper Sonoran Life Zone

The Upper Sonoran Life Zone covers a large expanse of the relatively low altitude country in the arid Wind River Basin at elevations generally below 5,500 feet. Vegetation includes different species of saltbush, greasewood (*Sarcobatus vermiculatus*), different species of rabbitbrush, sagebrush, including spiny sagebrush (*Artemisia spinescens*), Plains yucca (*Yucca glauca*), and different species of prickly pear cactus, with skunk bush (*Schmaltzia trilobata*) and different species of juniper on the

bluffs, and broad-leafed cottonwood (*Populus occidentalis*), buffaloberry (*Lepargyrca agrentea*), flowering currant (*Ribes longiflorum*) and wolfberry (*Symphoricarpos occidentalis*) along the streams and drainages (USDA-SCS 1974).

Specific vegetation observed within the project area which is characteristic of this life zone and the soils identified therein include greasewood, rabbitbrush, sagebrush, prickly-pear cactus, Indian ricegrass, blue grama grass, western wheatgrass, and prairie junegrass.

The Upper Sonoran zone within the project area is weak in nature in that it exhibits a relatively small number of the characteristic life zone species of mammals and birds. Mammalian species which exemplify this zone within the Wind River Basin, and which would be expected to occur within the specific project area include the Pronghorn antelope *(Antilocapra americana)*, Colorado chipmunk (*Eutamias quadrivittatus*), Northern grasshopper mouse (*Onchomys leucogaster articeps*), kangaroo rat (*Dipodomys ordii luteolus*), desert cottontail (*Sylvilagus auduboni*), spotted skunk (*Spilogale putoris*) and California bat (*Myotis californicus californicus*).

3.10.2 Transition Life Zone

The transition life zone exists in the Wind River Basin generally above 5,500 feet and includes vast interior sagebrush plains, watersheds, plateaus and high altitude basins. This zone is marked along its upper boundary where sage dominated slopes give way to characteristic vegetation of the Canadian zone (i.e., aspen and conifer forests). The lower limit of this zone is indicated by either the absence, or a smaller number, of Upper Sonoran species.

Characteristic vegetation of the Transition zone includes sagebrush dispersed widely throughout the zone, and a variety of Douglas fir (*Pseudotsuga mucrontata*) and Rocky Mountain white pine (*Pinus murrayana*) in higher mountain areas. On streams at the base of the mountains the zone is marked by narrow leafed cottonwood, diamond willow (*Salix mackenziana*), Rocky Mountain birch (*Betula fontinalis*), wild gooseberry (*Grossularia inermis*) and currant. Foothills and lower mountain slopes are occupied by Rocky Mountain and creeping junipers (*Juniperus sabina*), bebb willow (*Salix bebbiana*), mountain mahogany, rabbitbrush and others (USDA-SCS 1974).

Specific vegetation observed within the project area which is characteristic of this life zone and the soils identified therein include rabbitbrush, sagebrush, Indian ricegrass, blue grama grass, western wheatgrass, and prairie junegrass. Representative species of birds for the Transition life zone include sage grouse (*Centrocercus urophasianus*), sharp-shinned hawk (*Accipiter striatus*), saw-whet owl (*Aegolis acadicus*), blackbilled magpie (*Pica pica*), mountain song sparrow (*Melospiza melodia montana*) and the veery (*Hylocichla fuscescens*). Mammals include Mule deer *(Odocoileus hemionus)*, Black Hills red squirrel (*Tamiasciurus hudsonicus dakotensis*), Wyoming (*Citellus richardsoni clegans*) and Uinta (*Citellus armatus*) ground squirrels, western jumping mouse (*Zapus princeps)*, white-tailed jack rabbit (*Lepus townsendi campanius*) and others (USDA-SCS 1974).

3.10.3 Economically Important Wildlife Species

Wildlife species of economic importance (game species) which are found within the proposed project area are listed below:

- Pronghorn antelope *(Antilocapra americana)*

  Historically found throughout the sagebrush upland areas of the Upper Sonoran and Transition Life Zones throughout the Wind River Basin.

- Mule deer *(Odocoileus hemionus)*

  Found primarily in the sagebrush upland areas of the Transition Life Zone. Seasonal distributions may vary from the Hudsonian Life Zone (timberline) to the Upper Sonoran Life Zone (semi-arid lowlands).

- Sage grouse *(Centrocercus urophasianus)*

  Occurs widely throughout sagebrush upland areas of the Transition Life Zone within the Wind River Basin.

Antelope and mule deer populations residing in that portion of the project area located on the east side of Natrona County Road 212 (Gas Hills Road) are classified within the Rattlesnake Herd Unit, which includes antelope hunt areas 70, 71, and 72 and deer hunt areas 88 and 89. This portion of the proposed project area is specifically included within antelope hunt area 72 and deer hunt area 89. Herd objectives for both antelope and deer in the Rattlesnake Herd Unit are 12,000 and 5,500 post hunt animals, respectively (WGFD 1997a). Antelope and mule deer populations residing in that portion of the project area located on the west side of Natrona County Road 212 (Gas Hills Road) are classified within the Beaver Rim Herd Unit, which includes antelope hunt areas 65-69, 74, and 106 and deer hunt area 90. This portion of the proposed project area is specifically included within antelope hunt area 74 and deer hunt area 90. Herd objectives for both antelope and deer in the Beaver Rim Herd Unit are 25,000 and 2,600 post hunt animals, respectively (WGFD 1997b). Generally speaking, antelope and deer numbers in both herd units are well below objective levels due to a combination of high animal mortality (particularly for antelope) during the winter of 1992/93 and the cumulative impacts of sustained drought on population recruitment. The inability of these animal populations to rebound from winter losses during 1992/93 has resulted in license reductions and a concomitant reduction in hunter opportunity (WGFD 1997a, 1997b).

Sage grouse populations in this area of Wyoming remain well below both historic and WGFD desired levels due to low recruitment resulting from poor nesting conditions over the past 7 years (Patterson 1997). The project area is not known to contain active leks; however, there have been no intensive inventories conducted to identify sage grouse strutting activity in the area. While observations of grouse in the area are limited (WGFD 1998), the presence of droppings on ridge tops throughout the CRU would indicate that the area does receive use by grouse at some point during the year.

In addition to the game species mentioned above, this area also supports a variety of habitats for non-game vertebrates including numerous species of passerine birds and small mammals generally identified in Sections 3.10.1 and 3.10.2. These small birds and mammals form a prey base for numerous avian and terrestrial predators including, but not limited to, coyotes, badgers, mountain lions, great horned owls and plains raptors including golden eagles, ferruginous and red-tailed hawks.

3.10.4 Raptors

In the spring of 1996, BLM personnel conducted several inventories within the CRU in order to determine the extent of raptor nesting activity therein. These inventories were conducted in response to oil/gas exploration and development activities proposed by both Intoil, Inc. and Prima Oil & Gas Company in and adjacent to the CRU. Seven (7) nest structures were identified in or adjacent to the CRU as a result of these surveys. A follow-up inventory of the CRU was conducted in 1997 by Anderson Environmental Consulting (AEC) to determine nesting activity on the 7 nests previously identified by BLM in 1996. The AEC inventory also surveyed a one-half mile buffer zone adjacent to the CRU boundary in anticipation of additional exploration and development therein by Intoil.

In addition to the BLM and AEC nesting inventories referenced above, additional inventories of raptor nesting activity in the general area have been conduced by Hayden-Wing Associates (HWA) in conjunction with oil/gas exploration and development activity proposed in the Cave Gulch-Bullfrog-Waltman Natural Gas Development Project Area (CGBWNGDPA). The HWA inventories have been conducted annually since 1994 and currently encompass a 273 square mile survey area which includes the northern portion of the CRNGDPA. Raptor nests discovered by HWA within the Greater cave Gulch Raptor Analysis Area (GRAA) in conjunction with these inventories were identified by a numbering system starting with nest number 1 and ending in 1997 with nest number 194. Nests which were inventoried by AEC in 1997 and which had not been previously identified by HWA were assigned an identification number beginning with nest number 195. Table 3.8 summarizes the results of both the 1996 and 1997 inventories of raptor nesting activity in the CRU and surrounding areas with the approximate location of those raptor nests identified in Table 3.8 and depicted in Figure 3.4.

3.10.5 Special Status Wildlife Species

3.10.5.1 Threatened and Endangered Species

Special status wildlife species include those species which are in danger of extinction due to drastic population declines and which have subsequently been listed as threatened or endangered (T/E) pursuant to the *Endangered Species Act* (ESA) of 1973 (as amended). Currently listed T/E species which may occur within the project area include:

Table 3.8

1996/97 Raptor Nesting Activity In or Adjacent to the CRNGDPA

Nest Number	Raptor Species	Nest Condition	Legal Location of Nest Structure				1996 Status	1997 Status
			Quarter	Section	Township	Range		
64	FH [1]	Excellent	SE¼SE¼NW¼	3	35 North	87 West	Inactive	Failed
65	FH	Excellent	SE¼NE¼SW¼	3	35 North	87 West	Inactive	Inactive
168	FH	Poor	SW¼SE¼SE¼	4	35 North	87 West	Inactive	Inactive
171	FH	Poor	NW¼NW¼NE¼	4	35 North	87 West	Inactive	Inactive
169	FH	Excellent	NE¼SE¼NW¼	10	35 North	87 West	Inactive	Active
170	FH	Excellent	SW¼SE¼NE¼	10	35 North	87 West	Active	Inactive
143	FH	Poor	NE¼SE¼NE¼	11	35 North	87 West	Inactive	Inactive
195	FH	Poor	NE¼NE¼SW¼	15	35 North	87 West	?	Inactive
196	FH	Poor	NE¼NE¼SW¼	15	35 North	87 West	?	Inactive
197	FH	Fair	SE¼NW¼NE¼	21	35 North	87 West	?	Inactive
140	FH	Fair	NE¼SE¼SE¼	27	36 North	87 West	Inactive	Inactive
192	GE [2]	Excellent	NE¼NW¼SE¼	33	36 North	87 West	Active	Active [3]
62	FH	Poor	NE¼SW¼SE¼	34	36 North	87 West	Inactive	Inactive
63	FH	Fair	SE¼NW¼SE¼	34	36 North	87 West	Inactive	

Sources: AEC 1997, HWA 1996, HWA 1997

1. FH = Ferruginous hawk.
2. GE = Golden eagle.
3. Nest was occupied by a pair of common ravens in 1997.

- **Bald eagle** *(Haliaeetus leucocephalus)*

  Migrant through the area during the fall and spring migrational periods, seasonal resident during the winter months along the North Platte River.

  The primary habitat for bald eagles migrating through or wintering in central Wyoming would include riparian area(s) along the North Platte River in Natrona County and both the Big and Little Wind Rivers in Fremont County, which provide roosting and perching areas for eagles foraging along the river course and their adjacent uplands. Roosting areas for bald eagles are also known to occur on the west end of Casper Mountain (Jackson Canyon) and on Pine Mountain (both of which are located in Natrona County).

- **Black-footed ferret** (*Mustela nigripes*)

  Potential resident in prairie dog *(Cynomys sp.)* colonies.

3.10.5.2 Candidate Species

Special status wildlife species also include those candidate species which have been proposed for listing as threatened or endangered (C1 species), and those candidate species which are considered "at risk" but which generally lack sufficient biological (population) data to warrant listing under the ESA (C2 species). While these candidate species warrant concern due to general population declines, they do not receive statutory protection under the ESA. Candidate species (C1) which may occur within the project area include:

- **Swift fox** (*Vulpes nigripes*)

  The swift fox historically inhabited short and mid-grass prairies throughout the northern Great Plains from the foothills of the Rocky Mountains across the prairies of the Dakotas, Nebraska, Oklahoma, and Texas. While the swift fox was once common throughout its range, they now occur only on the remnants of shortgrass prairie (Clark and Stromberg 1987). The species is most common in areas with relatively flat to gently rolling topography in eastern Wyoming and portions of northeastern Colorado (Fitzgerald *et al* 1994).

  Declines in swift fox populations have been primarily attributed to the indiscriminate use of predator control methods aimed primarily at wolves in the waning years of the nineteenth century and later at coyotes during the first half of the twentieth century. A decline in the use of indiscriminate predator control practices (e.g., poisons such as 1080 and trapping) have resulted in an apparent increase in swift fox populations throughout the west. In this regard, investigations by Woolley *et al* (1995) suggest that the swift fox is more widely distributed in Wyoming than previously thought.

- **Mountain plover** (*Charadrius montanus*)

  The mountain plover is generally considered an associate of the shortgrass prairie, which is dominated by blue grama (*Bouteloua gracilis*) and buffalo grass (*Buchloe dactyloides*)(Graul 1975). The species breeds across the western Great Plains and at isolated locales in western Colorado, Wyoming and New Mexico (Leachman and Osmundson 1990). Between 1966 and 1991, continental populations of the mountain plover declined by 63% (Knopf 1994), with the Pawnee National Grassland in Weld County, Colorado being both the historic and current breeding stronghold of this aridland member of the family Charadriidae (Graul and Webster 1976). A second major breeding population of mountain plovers is currently located on the Charles M. Russell National Wildlife Refuge in Phillips, Montana (Knopf and Miller 1994).

In August of 1997 a search was made of both the WGFD Wildlife Observation System (WOS) and the Wyoming Natural Diversity Database (WNDDB) records to determine if any sightings of either swift fox or mountain plover had been recorded within a 6,084 square mile area centered on the CRNGDPA. The search area included Townships 30 through 42 North and Ranges 79 through 91 West, inclusive. No sightings of either species were recorded in the WNDD for the survey area. Recorded observations in the WOS database included one swift fox sighting in Township 36 North,

Range 83 West in May of 1988; however, a specific legal location for the sighting was not given. Seven sightings of mountain plover in the survey area were recorded between April 21, 1981 and June 15, 1994 (WGFD 1997c, WNDDB 1997). One additional mountain plover sighting was made in conjunction with the Cave Gulch-Bullfrog-Waltman Natural Gas Development Project on July 2, 1997 (Fitzgerald 1998). The legal locations of these mountain plover sightings are provided in Table 3.9.

Table 3.9

Recorded Mountain Plover Observations in the 6,084 mi^2 Survey Area

Date of Observation	Legal Location of Plover Observations				Number Observed	Observed Habitat Type
	Quarter	Section	Township	Range		
04/21/1981	?	?	34 North	86 West	3	Sagebrush-Grassland
06/14/1984	?	14	30 North	85 West	1	Not Recorded
06/25/1984	?	36	35 North	86 West	1	Sagebrush-Grassland
09/14/1987	SE¼NW¼	23	31 North	81 West	1	Saltbush
07/05/1990	NW¼SE¼	30	30 North	85 West	1	Shoreline
06/15/1994	SE¼SE¼	36	38 North	91 West	1	Not Recorded
06/15/1994	SW¼	24	40 North	90 West	1	Not Recorded
07/02/1997	NW¼NW¼	21	37 North	86 West	1	Not Recorded